Serial No. 10/553,809
Art Unit 2851

PU030134
Customer No. 24498

LISTING AND AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently amended) A method for restoring audio information embodied within an analog, optically-recorded variable density soundtrack of a film, comprising the steps of:

optically scanning successive lines of the soundtrack to yield a digital signal representation of the audio information;

storing the digital signal;

applying at least one or more of the following statistical processing technique operations to the stored digital signal to restore at least one characteristic of the audio information:

a) averaging pixel intensities over each scanned line, using each scan line's average pixel intensity to represent the audio amplitude at that line;

b) calculating a standard deviation of each pixel in each line scan, eliminating pixel values that deviate above a user defined threshold, and calculating mean to obtain a noise reduced instantaneous amplitude;

c) creating a look-up-table to correct for data values derived from non-linear areas of film density transfer characteristic;

d) performing statistical and regression analysis of the pixel intensities values to extend beyond non-linear areas of film density transfer characteristic; and

e) performing adaptive filtering to minimize effects of inter-modulation distortion.

2. (Cancelled).

3. (Cancelled).

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4. (Currently amended) The method according to ~~claim 3~~ claim 1 further comprising the step of performing one the operations in response to operator selection of said one operation.

5. (Currently amended) The method according to ~~claim 3~~ claim 1 further including the step of performing a plurality of operations.

6. (Currently amended) The method according to ~~claim 3~~ claim 1 further including the step of performing all of the operations.

7. (Original) The method according to claim 1 further including the step of quantizing the digital signal to at least 12-bit resolution.

8. (Currently amended) The method according to ~~claim 2~~ claim 1 further including the step of synchronizing the scanning of successive lines to movement of the soundtrack to yield a prescribed number of line scans per unit of time.

9. (Currently amended) The method according to ~~claim 2~~ claim 1 wherein the step of scanning successive lines of the soundtrack further comprises the step of displacing the film relative to a line scan camera.

10. (Original) The method according to claim 9 further including the step of aligning the line scan camera with respect to the soundtrack so that the soundtrack substantially fills a width of the line scan camera.

11. (Original) The method according to claim 9 further including the step of azimuth aligning the tine scan camera so that equal density values of the soundtrack, when displayed concurrently, appear with substantially equal brightness.

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12. (Original) The method according to claim 9 further including the step of aligning the soundtrack relative to the line scan camera so that any positional variation of an audio representative envelope of the soundtrack remains within a digital image of the soundtrack.

13. (Currently amended) The method according to ~~claim 3~~ claim 1 wherein the ~~step~~ operation of creating a look-up table further includes the step of mapping a linear density value to a mean amplitude value if the mean value falls in a linear range.

14. (Currently amended) The method according to ~~claim 3~~ claim 1 wherein the ~~step~~ operation of performing adaptive filtering includes choosing an empirical filter value A_{lk} in accordance with the formula:

$$A_{lk} = (\sum \beta A_{k-1} Sin(wt_k + \phi) + \beta A_{k-2} Sin(wt_k + \phi) + \beta A_{k-3} Sin(wt_k + \phi) + ... + \beta A_{k-n} Sin(wt_k + \phi)) +$$
$$(\sum \kappa A_{k+1} Sin(wt_k + \phi) + \kappa A_{k+2} Sin(wt_k + \phi) + \kappa A_{k+3} Sin(wt_k + \phi) + ... + \kappa A_{k+n} Sin(wt_k + \phi))$$

15. (Currently amended) A system for restoring audio information embodied within an analog optically recorded variable density soundtrack of a film, comprising the steps of:

an optical scanner for scanning successive lines of the soundtrack to yield a digital signal representation of the audio information;

a storage system for storing the digital signal;

a processor for applying ~~at least~~ one or more of the following statistical processing ~~technique~~ operations to the stored digital signal to restore at least one characteristic of the audio information:

a) averaging pixel intensities over each scanned line, using each scan line's average pixel intensity to represent the audio amplitude at that line;

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b) calculating a standard deviation in each line of scanned data to eliminate extraneous pixel values.

c) calculating the standard deviation of each pixel in each line scan, eliminating pixel values that deviate above a user defined threshold, and calculating mean to obtain a noise reduced instantaneous amplitude;

d) creating a look-up-table to correct for data values derived from non-linear areas of film density transfer characteristic;

e) performing statistical and regression analysis of the pixel intensities values to extend beyond non-linear areas of film density transfer characteristic; and

f) performing adaptive filtering to minimize effects of inter-modulation distortion.

16. (Cancelled).

17. (Cancelled).

18. (Currently amended) The system according to ~~claim 17~~ claim 15 wherein the processor performs one of the statistical processing operations in response of operator selection of said one operation.

19. (Currently amended) The system according to ~~claim 17~~ claim 15 wherein the processor performs a plurality of statistical processing operations.

20. (Currently amended) The system according to ~~claim 17~~ claim 15 wherein the processor performs all of the statistical processing operations

21. (Currently amended) The system according to ~~claim 16~~ claim 15 wherein the line scan camera yields a quantized digital signal having at least 12-bit resolution.

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22. (Currently amended) The system according to ~~claim 16~~ claim 15 further including means for synchronizing the scanning of successive lines of the soundtrack by the camera to movement of the soundtrack to yield a prescribed number of line scans per unit of time.

23. (Currently amended) The system according to ~~claim 16~~ claim 15 further including means for displacing the film relative to the line scan camera.

24. (Currently amended) The system according to ~~claim 16~~ claim 15 further including means for aligning the line scan camera with respect to the sound track so that the soundtrack substantially fills a width of the line scan camera.

25. (Currently amended) The system according to ~~claim 16~~ claim 15 further including means for azimuth aligning the line scan camera so that equal density values of the soundtrack, when displayed concurrently, appear with substantially equal brightness.

26. (Currently amended) The system according to ~~claim 16~~ claim 15 further including means for aligning the soundtrack relative to the line scan camera so that any positional variation of an audio representative envelope of the soundtrack remains within a digital image of the soundtrack.

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